SALTON SEA UNIT 6

CURE DATA REQUESTS SET TWO (# 99 – 236)

WATER RESOURCES

Background

The Project is within the 100-year flood zone and is surrounded on three sides by 100-year flood zones. (Response to Data Adequacy Comments, p. WATER-13, FIRM map.) The entire site will be enclosed by an 8-foot high perimeter berm. The northern and western portions of the dike already exist, but apparently not the balance of the dike. (AFC, Appx. J, p. 3.) The AFC concluded that the 8-foot dike would eliminate potentially significant flooding impacts of the Project and thus provided no analysis of flooding impacts. (AFC, p. 5.4-9.) However, surrounding the Project site with an 8-foot high berm would remove 80 plus acres from the floodplain, increasing the base flood elevation outside of the berm and thus aggravating flooding impacts elsewhere. This may be a significant impact of the Project that should be mitigated by providing an equivalent volume of flood plain volume elsewhere.

Data Request

99. Please provide a topographic map that shows all existing embankments, their height, and annotates their condition.

100. Were any of the existing embankments constructed using filter cake? If yes, please identify these areas on the map provided in Data Request #99. Please estimate the reduction in 100-year flood plain volume due to the Project. Please support your answer with hydraulic calculations, model input and output files, and all other information you relied on.

101. Is the applicant willing to provide flood plain storage equivalent to the volume removed by the Project? If no, please explain why not and support your answer.

Background

The Project includes two brine ponds, designed to contain up to 4 hours of spent brine released from the clarifiers under upset conditions. The ponds also receive liquids from the thickener, from bermed areas around plant equipment and from emergency relief tanks, as well as reject water from the reverse osmosis system. (AFC, pp. 3-11, 3-16; Response to CEC Data

Adequacy Comments, p. BIO-4.) The Application for Waste Discharge indicates that the brine ponds would also collect brine from production wells when they are flow tested after drilling and from production wells when brine is initially introduced into the facility during startup. We understand that other similar brine ponds have leaked, contaminating underlying groundwater.

Data Request

102. Please provide detailed chemical composition data for each stream that would be routed to the brine pond, including the reverse osmosis reject and liquids from the thickener, bermed areas around plant equipment, and emergency relief tanks for all constituents included in AFC Table 3.3-2.

103. Based on operating experience at the existing Units 1-5, please estimate the frequency of discharge, the length of time wastes would remain in the ponds, and annual average amount of each of the following streams: reverse osmosis reject; liquids from the thickener, bermed areas around plant equipment, and emergency relief tanks; and startup and drilling brine.

104. Please present a sample calculation that shows how the brine pond composition data in Table 3.3-2 was calculated. If not otherwise provided in response to Data Requests #102 and #103, please support your answer with volumes and chemical composition data for each waste stream.

105. Will any waste streams not otherwise identified in Data Requests #102 through #104 be discharged into the brine pond? If yes, please identify the stream(s), estimate their volume, and provide chemical composition data.

106. Please clarify which waste streams will be discharged to the brine ponds on a routine basis and which will be discharged only under emergency, upset, or intermittent conditions.

107. Please list the types of events that would result in discharges to the brine ponds.

108. The AFC indicates that the ponds will contain "aerated" brine. (AFC, p. 5.4-1.) Please explain what is meant by "aerated."

Background

The rough grading plan in Figure 3.3-11 shows three ponds, a below-grade brine pond, an above-grade water pond, and a below-grade detention pond. The detention pond would collect storm water runoff. (AFC, p. 1-7.) Elsewhere, the water pond is referred to as a "service water pond." (AFC, p. 3-7). Figure 3.3-1B indicates that the service water pond would receive canal water from IID Vail Lateral 4A. The Response to CEC Data Adequacy Comments at page WATER-19 indicates that the service water pond provides a 6-day water supply buffer when service interruption from IID is anticipated. It would appear that detention of IID water in open ponds would result in significant evaporation and would thus constitute waste of Colorado River water. Further, groundwater is present at relatively shallow depths across the site, generally from zero to 6 feet below surface. (AFC, Appx. J.) Thus, construction of these ponds would likely require grading below the water table, in violation of land use codes. (AFC, p. 5.3-18.) Finally, it is likely that these ponds will be below the groundwater table, requiring dewatering during construction, perhaps during operation, and/or special construction techniques, e.g., use of anchor piles. The AFC does not contain sufficient information to allow the evaluation of these issues.

Data Request

109. Please provide a plan, section and detail for the storm water and service water ponds. The plan should include the design basis for all liner systems.

110. Please explain how these ponds can be constructed without violating Imperial County land use codes, as noted in the AFC at page 5.3-18.

111. Please describe the operation and maintenance of the storm water and service water ponds.

112. The service water pond would be designed to provide a 6-day supply buffer, amounting to 209,800 cubic feet or about 1.6 million gallons. (Response to CEC Data Adequacy Comments, p. WATER-19.) How frequently would IID water be routed to the service water pond? Please support your answer with an analysis of the reliability of the IID Colorado River supply and provide all information in support of your analysis.

113. The Water Quality Control Plan for the Colorado River Basin encourages practices that conserve water. (Water Quality Control Plan, Colorado River Basin – Region 7, p. 1-4, 4-1.) Please explain why a surface pond is used in a desert environment to contain freshwater supply, rather than an enclosed 2 million gallon storage tank?

114. Please estimate the maximum daily and long-term annual average amount of water that would be lost to evaporation from the service water pond.

115. Would the applicant be willing to replace the service water pond with an enclosed storage tank? If no, please explain why not and support your answer.

116. Will any streams other than canal water be routed to the service water pond? If yes, which streams and under what conditions would they be routed to this pond?

117. Will any waters other than storm water runoff be routed to the detention pond? If yes, which waters and under what conditions would they be routed to this pond?

118. The Geotechnical Report indicates that dewatering will likely be required during construction of the detention basin (and the service water pond, which was shown as a single basin on the site plan evaluated in the Geotechnical Report). (AFC, Appx. J., p. 13.) Will dewatering of these two basins be required during construction?

119. If the answer to Data Request #118 is yes, please estimate the amount of water that will be removed, its chemical composition, and the proposed disposal methods.

120. The Geotechnical Report indicates that permanent dewatering of the detention and service water basins may be necessary, or alternatively, that these basins would have to be designed to resist the uplift pressure exerted by groundwater seepage, including the use of anchor piles. (AFC, Appx. J, p. 13.)

    (a) Will the detention pond and the service water pond require permanent dewatering?

(b) If the answer to subpart (a) is yes, please estimate the amount of water that will be removed, its chemical composition, and the proposed disposal methods.

(c) If the answer to subpart (a) is no, please explain the design features that will be included in these basins to resist uplift pressure exerted by groundwater seepage.

121. Solids would accumulate in the brine ponds. Please provide the following information on these solids:

(a) How frequently would solids be removed?

(b) Please provide chemical composition data for the solids.

(c) Please estimate the volume and mass of solids that would accumulate in the ponds.

(d) Please describe the procedures that will be used to remove and dispose of brine pond solids.

(e) Are the procedures described in subpart (d) the same as currently used at existing Salton Sea units? If no, please explain why different procedures are proposed for SSU6.

Background

The Project includes seven brine injection wells. These wells would be classified as Class V wells under the federal underground injection control ("UIC") program. The U.S. EPA, Region 9, directly implements the UIC program for Class V injection wells in California. However, the State of California also regulates these wells and has substantial responsibility as set forth in a Memorandum of Agreement between the U.S. EPA and CDOGGR. The LORS section of the AFC does not acknowledge the federal role, nor the MOA. Further, the AFC contains no information on the DOGGR permitting process.

Data Request

122. Please provide a copy of the permit application for each injection well that the applicant will submit to DOGGR and EPA.

Background

The Salton Sea Unit 6 project site is underlain by a shallow aquifer. (AFC, p. 5.4-4.) The AFC indicates that a small portion of the groundwater in the Imperial Hydrologic Unit is designated for municipal purposes, but that most groundwater is exempt because it has TDS concentrations that exceed 3,000 mg/L. (AFC, p. 5.4-6.) However, under the Underground Injection Control ("UIC") Program, an underground source of drinking water ("USDW") is defined as an aquifer which contains a sufficient quantity of ground water to supply and contains fewer than 10,000 mg/L TDS. 40 CFR 144.3. If the Imperial Hydrologic Unit qualifies as a USDW, then the UIC regulations prohibit injection of fluids which cause a violation of any primary drinking water regulation or otherwise adversely affects the health of persons and a permit is required. 40 CFR 144.12(a); 144.84(b)(1). The AFC does not contain sufficient information to evaluate this issue.

Data Request

123. Please provide a map that shows the boundaries of the shallow aquifer that underlies the site and identify the portion of the aquifer that is designated for municipal purposes.

124. Please provide water quality data that is representative of shallow groundwater beneath the site.

125. Please provide hydrologic properties of the shallow aquifer beneath the site, including permeability, storativity, and transmissivity.

126. Please estimate the volume of groundwater present in the shallow aquifer.

127. Please provide a map that locates all wells within a 5 mile radius of the site that are completed in the upper aquifer, provide a copy of the well logs, and identify the use of pumped waters.

128. Geothermal fluids can move upward along fracture planes and spread into permeable sediments. Faults beneath the cap rock that

separates the shallow aquifer from the deeper geothermal reservoir provide for limited upward migration of geothermal fluids.[1]

(a) Is the applicant aware of any evidence from existing geothermal operations of injectate migration into the shallow aquifer? If yes, please describe all known instances and provide all supporting information.

(b) Is the applicant aware of any evidence from existing geothermal operations that shows that there is no injectate migration into the shallow aquifer? If yes, please provide all such evidence.

(c) Has the applicant conducted any studies to determine if its proposed injection program would impact the shallow aquifer? If yes, please provide copies of all such studies.

(d) Have any field studies been conducted in the Salton Sea Geothermal Resource Area to determine if brine injection is impacting overlying aquifers? If yes, please provide copies of and/or references to all known studies.

129. The Phase I Site Assessment indicates that there is one drinking water well within 1/8 to 1/4 mile of the site and two within 1/2 to 1 miles of the site. Please provide logs for these two wells, locate them on a map, and evaluate the impact of the Project on their capacity and quality.

Background

The Project would use IID fresh water for cooling tower makeup. SWRCB Policy 75-58 requires that other sources of water be evaluated. The Response to CEC Data Adequacy Comments, page WATER-15, states with no support that other sources of water, drainage water and groundwater, were evaluated, but were not appropriate for use because they were not available in sufficient quality or quantity.

[1] S.C. Arnold, Near-Surface Groundwater Responses to Injection of Geothermal Wastes, Report DOE/ID/12347-T1, June 1984.

Data Request

130. Please identify the water quality requirements for all proposed uses of the IID fresh water.

131. Please support your conclusion that alternative sources of water are not suitable, by presenting your analysis and all supporting information including the location of each source, quantity of water available, and composition of water available.

Background

The USGS quad maps for the area identify two nearby springs. In addition, monitoring by previous owners identified several pre-existing springs and mud pots along faults in the area. The production and injection of brine could affect these local resources.

Data Request

132. Please locate all known springs and mud pots in the area on a map and provide descriptive information for each, including flow rate, biota present, and recreational or other uses.

133. Please evaluate whether the Project would impact these resources. Support your analysis with engineering calculations, model output, and all other relevant information.

GEOLOGY

Background

The Project site will be surrounded by an 8 foot high dike as flood protection. According to the Geotechnical Report (Appx. J), the northern and western portions of the dike already exist. (Appx. J, p. 3.) However, their stability has not been evaluated. The AFC acknowledges that there is "potential for earthquake induced flooding of the site if the Vail Lateral 5 Drain embankment forming the western site boundary were to fail" (AFC, p. 5.2-5) and elsewhere, "because the site is situated below the level of the Salton Sea, and because the Vail Lateral 5 Drain embankment along the western side of the site has only a few feet of freeboard, the potential for flooding at the site as a result of a seiche is considered moderate." (AFC, p. 5.2-11.) The AFC proposes future evaluation of the stability of these existing embankments to characterize the hazard and mitigation measures, including raising the embankment and/or ground improvements. (AFC, p. 5.2-16, Geo-5.) The AFC does not appear to evaluate the impacts of improving the stability of the existing embankment, which include noise and air emissions from construction and from importing soil, as well as biological impacts.

Data Request

134. Please evaluate worst-case impacts of improving the stability of the existing embankment, including biology, air quality, noise, and water resources.

Background

The original site layout was modified after the initial geotechnical investigation to avoid adverse soil conditions beneath major Project facilities. (AFC, Appx. J.) However, in the final site arrangement, reflected in the AFC, the clarifier tanks are "underlain by soils that are more variable and potentially more compressible than at their former location." (Appx. J., Addendum, p. 3.) The clarifier tanks contain hazardous materials that could be spilled during a seismic event. The AFC does not discuss the impacts of these unfavorable soil conditions.

Data Request

135. Please evaluate and discuss the potential impact of soil conditions beneath the clarifier tanks.

136. Please discuss the mitigation measures that will be implemented to prevent a release of the tank contents during a seismic event. Please provide all evidence that such measures ensure that the impact from a seismic event on the clarifier tanks would not be significant.

Background

The AFC acknowledges that the site is subject to subsidence from localized fluid withdrawal. However, it additionally claims that subsidence caused by fluid withdrawal would not create differential settlement and thus would not result in significant impacts, without presenting any analysis. (AFC, p. 5.2-10.) However, this is inconsistent with conclusions drawn by independent researchers who modeled subsidence in the area. (Layton 1980.[2]) Partial injection of produced brines, as proposed here, results in a net pressure loss, which can result in differential settlement. Slope changes, even as small as a few centimeters, may reverse flow in irrigation canals, removing large land areas from production at a substantial loss to growers.

Data Request

137. Please provide the subsidence data compiled by the applicant, cited in the AFC, Section 5.2.1.4.4, page 5.2-10, and relied on in the subsidence and settlement discussion to conclude that differential settlement would not occur. Please provide all other evidence that differential settlement would not occur. Your response should include a map that shows the locations where subsidence is measured and include at least 10 years of individual measurements at each monitoring station.

138. Please reconcile the results of the Layton study cited above with the conclusions in the AFC.

139. Please present an analysis similar to that by Layton that demonstrates that injection of only 83% of the produced fluid over the 30 year project life would not affect the land slopes and hence the gravity-feed irrigation canals in the area.

[2] D. Layton, An Assessment of Geothermal Development in the Imperial Valley of California, Lawrence Livermore National Laboratory Report DOE/EV-0092, 1980.

140. Please describe the monitoring that the applicant proposes to evaluate subsidence from localized fluid withdrawal.

141. If the subsidence monitoring described in response to Data Request #140 shows a change in land slope, will the applicant commit to COCs that require repair of any irrigation canals, releveling canals or fields, changes in field operation, and/or reimbursement of land owners for lost production?

Background

The soils at the site are expansive, corrosive, liquefiable, and subject to settlement. The AFC recommends substantial modification to mitigate for these adverse soil conditions, including ground improvements and deep foundations. (AFC, pp. 5.2-15,16.) These improvements would result in a number of environmental impacts that do not appear to have been considered in the AFC. Please provide the following information to allow the impacts of geology mitigation measures to be evaluated:

Data Request

142. Deep foundations, consisting of piles driven 3 to 4 feet below grade into dense sands, would be used to prevent settlement. (AFC, p. 5.2-15, Geo-4.)

(a) Please present a pile driving schedule that shows the number of pile drivers that will be in operation per month by location.

(b) Please identify the type and horsepower of the pile drivers that will be used.

(c) The emission inventory in Appendix G does not include any emissions from pile driving. Please estimate pile driving emissions.

NOISE

Background

The construction noise analysis in Section 5.11.2.2.1 concludes that the maximum construction noise would be 71 dBA at the Refuge residence. Because this is less than the significance threshold of 75 dBA Leq at the nearest residential receptor, the AFC concludes that construction noise is not significant. (AFC, p. 5.11-6.) This analysis is based on only a single pile driver at 2,500 feet from the source (105 dbA- 20log(2500/50)). However, there would be multiple sources of noise, which may combine to result in noise levels greater than the 71 dBA peak quoted in the AFC. In particular, due to poor soil conditions, deep foundations would be used throughout the site. (AFC, p. 5.2-15, Geo-4; Appx. J.) Thus, multiple piles may be driven simultaneously.

Data Request

143. Please prepare a construction noise analysis based on the worst-case month that considers multiple sources of noise simultaneously. Please support your analysis by identifying the basis for selecting the worst-case month, each piece of equipment assumed to be operating, its noise level, and any noise controls assumed to be used.

Background

The Cadna A Noise Prediction Model was used to estimate project-generated noise levels. However, the AFC does not contain supporting input and output files, preventing any meaningful review of the analysis.

Data Request

144. Please provide complete data input and output files for all noise analyses.

145. The power plant source sound levels are summarized in Table 5.11-4. Please provide vendor data that supports these values.

146. Octave band sound levels were not provided for the pumps. Please explain how octave band sound levels were accommodated in the Cadna Model.

AGRICULTURE AND SOILS

Background

The Project involves the construction of two new transmission lines, a new 16-mile L-Line Interconnection and a new 15-mile, IID Midway Interconnection. (AFC, p. 3-32.) These new lines would be routed through currently farmed areas. (AFC, Fig. 5.3-2A.) Aerial spraying is used to apply pesticides in the general area. The new transmission lines could pose a flight hazard to low-flying crop dusters. Please provide the following information required to evaluate the hazard of the new transmission lines to low-flying crop dusters.

Data Request

147. Please describe the pesticide application schedules and procedures currently employed for farmed areas along the transmission routes and other Project facilities that may pose a hazard to crop dusters.

148. If aerial spraying is currently or may be used along in the vicinity of any of the Project facilities, please evaluate the impact of these facilities on pesticide application procedures.

149. Please chronicle any historic accidents involving crop dusting or constraints on development of farmland that have been experienced in the area over the past 10 years.

Background

The AFC claims that the Universal Soil Loss and Chepil Wind Erosion Equations are not appropriate for the Project site. (AFC, p. 5.3-8.) Staff stated that soil loss for the pre-development, construction, and post-construction conditions must be calculated to design appropriate erosion control measures. The applicant responded that the Revised Universal Soil Loss Equation ("RUSLE") was not appropriate for the site because the site is level, receives low precipitation, and soils are only moderately susceptible to water erosion, among others. (Response to CEC Data Adequacy Comments, p. SOILS-3.) However, the applicant's response ignores wind erosion, which is an acknowledge problem in Imperial County. Wind erosion causes sand

blast damage to young seedling plants. Some crops, such as vegetable crops, are especially vulnerable to wind erosion.[3]

Data Request

150. Please provide a reference for the Chepil Wind Erosion Equation, cited on page 5.3-8 of the AFC.

151. Please explain with specificity why the Chepil equation is not appropriate for the site. Please support your answer with references to the published literature and supply copies of any references that are not publicly available.

152. There are alternatives to the Chepil Wind Erosion Equation that could be applied to the Project site. These include the USDA Wind Erosion Equation (USDA 1998) and the U.S. EPA Industrial Wind Erosion Equation. (AP-42, Sec. 13.2.5.) Please explain why these equations could not be adopted to estimate wind erosion from the Project site.

153. Please identify all wind erosion control measures that would be implemented during construction and operation of the Project.

[3] USDA, California Wind Erosion Prediction Guide, March 1998.

PROJECT DESCRIPTION

Background

The Project includes a reverse osmosis system. The reject from this system is sent to the brine ponds. The RO system apparently would be used to produce potable water. (AFC, p. 3-16.) However, it is not shown on the plot plan (Fig. 3.3-1B), the water balance (Fig. 3.3-9), or any of the heat and material balances. Finally, the chemical composition data for the RO reject stream is incomplete (Table 5.4-4).

Data Request

154. Please revise Fig. 3.3-9 to show the reverse osmosis system.

155. Will the RO system be used to supply any process water? If yes, please identify the uses and flow rates.

156. Please provide design information on the RO system.

157. Please provide complete chemical characterization data for the RO inlet, outlet, and reject stream. Data should be provided for all of the constituents listed on the inset tables on the heat/mass balances in Figures 3.3-10.

Background

The AFC indicates that the project includes a 16 mile double-circuit L-Line Interconnection and a 15-mile single-circuit IID Midway Interconnection. (AFC, p. 3-31.)

Data Request

158. Please explain the basis for proposing two transmission lines, instead of one, for the project and provide all justification you have for your answer?

Background

The AFC indicates that the Salton Sea Unit 6 Project will have a design life of 30 years. (AFC, pp. 2-1, 3-43.) However, elsewhere, the AFC indicates that the Project would provide 85% of its output to IID for only 20

years (AFC, p. 3-1). Further, the water supply contract with the IID is only valid for 21 years. (AFC, § 5.4, Will Serve Letter, § 6.1.1.) The AFC is silent on impacts beyond this 20 year life, even though the Project is being designed for a 30 year life.

Data Request

159. Please resolve the apparent discrepancy between the Project lifetime and the Project's contracts for services.

160. Please identify the water supply that would be used at the end of the 21 year life of the Will Serve Letter.

161. Please discuss operational modes and their environmental impacts after the IID contact terminates.

    (a) Will SSU6 remain a base loaded facility?

    (b) If the answer to subpart (a) is no, please identify potential changes in operational mode. For each, discuss potential changes in environmental impacts.

PUBLIC HEALTH

Background

Benzene would be removed from the brine/steam condenser gases using an activated carbon filter. The activated carbon filter would be regenerated on site about once per week using process steam. Backwash from the carbon filter would contain 1,400 ppm of benzene and would be discharged into an injection well. (AFC, p. 5.13-8.)

Data Request

162. Please provide complete chemical composition data for the carbon backwash.

163. The heat/mass balance in Figure 3.3-10D suggests that only the steam condenser gases would be treated using an activated carbon filter. Will the brine stream additionally be treated using an activated carbon filter to remove benzene?

164. If the answer to Data Request #163 is yes, please describe the process that would be used to treat the brine stream(s) and revise Figs. 3.3-10 to show the stream(s) that would be treated.

165. Please describe the carbon filter regeneration process and provide a process and instrumentation diagram ("P&ID").

166. Please describe the method(s) that will be used to control benzene vapors during the regeneration process.

167. Are there any air pollutant emissions from the regeneration process?

168. If the answer to Data Request #167 is yes, please estimate the emissions and revise the risk assessment to include them. If the answer to Data Request #167 is no, please provide all evidence that supports your answer.

169. The AFC indicates that the greatest potential for benzene exposure is during the handling of spent carbon absorption drums, but dismisses this as a concern because a service vendor will service

these drums. (AFC, p. 5.16-10.) However, impacts from handling the drums may be significant regardless of which company services the drums.

(a) Please describe the carbon drums and the procedures that will be used to fill, store, and transport them.

(b) Are there any air pollutant emissions from these drums?

(c) If the answer to subpart (b) is yes, please estimate emissions from handling of carbon drums and evaluate the worker and public health impacts of handling them. If the answer to subpart (b) is no, please provide all evidence that supports your answer.

Background

The AFC only evaluated acute health impacts of Project construction. It did not evaluate either noncancer chronic or cancer health risks because construction would only last 20 months. (AFC, p. 5.15-8.) However, it is standard practice to evaluate cancer risks, regardless of how short the exposure. The Office of Environmental Health Hazard Assessment ("OEHHA") has published guidance that requires a 70-year exposure duration, but allows evaluations for 9 years and 30 years. Diesel emissions during construction typically result in significant health risks when evaluated using an exposure duration of 9 years, the minimum allowed by OEHHA guidance.

Data Request

170. Please prepare a cancer risk analysis for diesel exhaust emissions during construction of on-site and linear facilities, assuming a 9-year, 30-year, and 70-year exposure duration.

171. Is the applicant willing to use oxidizing soot filters on all applicable equipment to mitigate the impacts from Project construction? If no, please justify your answer.

WASTE MANAGEMENT

Background

The Phase I Environmental Site Assessment ("Phase I") identifies a number of conditions that could result in significant impacts to construction workers. These include possible impacts from three existing on-site geothermal wells and historical geothermal exploration; possible impacts from historic application of organochlorine pesticides and chlorinated herbicides; possible impacts from unknown use of concrete slabs and chemical storage area with evidence of spills; and possible impacts from a burned area. (Appx. O, pp. 5-1/2.) The Phase I concluded that "additional evaluation of these areas may be warranted." (Appx. O, p. 5-2.) However, the AFC declines to further evaluate any of these conditions, arguing that soils would not be exported, no hazardous substances have been released, and elevated pesticides are likely present in surrounding areas. (AFC, p. 5.13-2.) However, this ignores the potential impact of contaminated soils on construction workers, especially those engaged in site preparation.

Data Request

172. There is a Memorandum of Understanding between the CEC and the Department of Toxic Substances Control ("DTSC") that requires DTSC to review Phase I ESAs. The AFC contains no evidence that DTSC has reviewed the Salton Sea Phase I.

    (a) Has the Phase I been submitted to the DTSC for review?

    (b) If the answer to subpart (a) is yes, please provide DTSC's review comments on the Phase I.

    (c) If the answer to subpart (a) is no, please submit the Phase I to DTSC pursuant to the MOU and provide the comments when they are available.

173. Lands that were farmed before organochlorine pesticides were banned frequently contain elevated concentrations of these pesticides that are high enough to pose a significant health risk to exposed construction workers. Thus, it is prudent to characterize

those soils that workers will be exposed to and evaluate them for potential health risks.

174. Please conduct a Phase II site assessment that addresses the four environmental conditions recognized in the Phase I site assessment.

175. The AFC indicates that workers would be trained to identify potentially contaminated soil and on proper procedures for handling such soil. (AFC, p. 5.13-2.) However, this is not identified as a mitigation measure. Further, it is not feasible to identify the types of contaminated soil likely present at the site without using chemical analysis.

    (a) Please explain the procedures that would be used by workers to identify pesticide-contaminated soils.

    (b) If the procedures identified in subpart (a) do not including monitoring, would the applicant accept a COC that required on-site screening of soils prior to disturbance? If no, justify your answer.

176. The Phase I indicates that there are three existing geothermal wells on the site, two of which are active production wells.

    (a) Please modify the plot plan in Figure 3.3-1B to show the location of these three wells.

    (b) Will these existing wells be used to supply the Project? If no, which existing facility do these wells supply?

    (c) Will these wells be abandoned as part of or in conjunction with the Project? If yes, please provide a schedule for abandonment.

    (d) Were these wells considered in the cumulative impact analyses?

    (e) If the answer to subpart (d) is yes, please provide all information that supports your answer, including associated air pollutant emissions.

(f) If the answer to subpart (d) is no, please modify the cumulative impact analysis to include the three existing geothermal wells.

(g) Are the mud pits associated with these wells still present on site?

(h) If the answer to subpart (g) is yes, please locate them on the revised plot plan provided in response to subpart (a).

(i) If the answer to subpart (g) is no, please describe the abandonment procedures that were used.

177. The site is currently bounded on two sides by berms that would be improved to serve as flood control protection for the site. Historically, filter cake with elevated concentrations of arsenic, radon, and other contaminants, were used to construct berms in the general area. Please provide chemical analyses of the soils in these existing berms that would be disturbed during Project construction.

LAND USE

Background

During the site visit on November 19, 2002, the Applicant stated that the boundary of the Salton Sea National Wildlife Refuge is located directly across the northern berm road from the project site as indicated by the National Wildlife Refuge sign. However, Figure 5.8-1B in the AFC incorrectly shows that the refuge boundary is not located directly across the northern berm road from the project site.

Data Request

178. Please revise Figure 5.8-1B and all corresponding analysis of impacts and compliance with LORS to reflect that the National Wildlife Refuge boundary begins directly across the northern berm road from the Project site.

179. Please provide the contract for the refuge leasing property from IID for the Salton Sea refuge.

Background

The Bureau of Land Management's (BLM) California Desert Conservation Area Plan prohibits transmission lines, except in designated corridors. The portion of the L-Line interconnection that would cross over BLM-owned land is not located within a designated corridor. (AFC, p. 5.5-17, 5.8-4.) Since the transmission line is not located within a designated corridor, the Applicant must apply for a CDCA Plan Amendment.

Data Request

180. Please provide a copy of your application for a CDCA Plan Amendment.

Background

The AFC infers the future closure of Obsidian Butte to the public. However, Obsidian Butte offers significant educational and recreational opportunities and is currently used for these and other purposes.

Data Request

181. Please identify whether you plan to close Obsidian Butte to the public and provide all information you may have on the potential socioeconomic and environmental impacts.

182. Please identify the existing extraction uses at Obsidian Butte.

183. Please revise all cumulative impact analyses to Obsidian Butte based on your answers to the two prior Data Requests.

BIOLOGY

Background

The Yuma clapper rail is a fully protected species under Fish and Game Code Section 3511. The Fish and Game Code prohibits the taking or possession of a fully protected species at any time. The AFC fails to discuss the issue of Fully Protected Species and does not conduct any analysis of compliance with this state law. Yet, the AFC indicates that the project will take Yuma clapper rails and their habitat.

According to the AFC, in a survey conducted by Ogden in 1994, a total of five (5) clapper rail locations were detected on or adjacent to the study area. (AFC, p. 5.5-9.) Moreover, Appendix K of the AFC states that, in a survey conducted by Ogden in 1994, a total of eight (8) clapper rails were detected on or adjacent to the Study area. (Appendix K, p. 8-1.) Three additional clapper rails were recorded adjacent to the plant site, during 2001 surveys conducted by URS biologists and 2002 surveys.

According to the AFC, in 1994, a fully protected Yuma clapper rail responded to calls near a potential well pad site at the Southwest Corner of Sinclair Road and Lateral Drain 4-A. In 2001, a Yuma clapper rail was detected in a drainage that runs along the east side of Well Pad OB1. It is not clear whether these clapper rails were detected at the same location in both years or at two separate locations. In addition, the AFC contains no analysis of the potential impacts to Yuma clapper rail at this location. Moreover, as stated at the site visit, this area is located in the Sonny Bono National Wildlife Refuge.

Seven fully protected Yuma clapper rails responded to calls from a freshwater marsh pond adjacent to the northern boundary of the project study area. However, the AFC contains no analysis of the potential impacts to Yuma clapper rail and its habitat at this location. Moreover, as stated at the site visit, this area is located in the Sonny Bono National Wildlife Refuge.

Two fully protected Yuma clapper rails responded to calls at McKendry Road to Obsidian Butte, which is the proposed pipeline route to Well Pad OB3. (AFC, Appendix K, p. 8-1.) The AFC acknowledges that the pipeline crossing to Well Pad OB3 will directly impact .05 acres of suitable habitat for Yuma clapper rail. (AFC, Appendix K, p. 8-1.) However, the AFC contains no further discussion of the potential impacts to the birds and how the proposed project plans to completely avoid the birds and their habitat in order to

comply with the Fully Protected Species provisions of the Department of Fish and Game Code.

Table 3 indicates that potential habitat for the Yuma clapper rail also exists in Vail Drain 5 along Severe Road. (AFC, Appendix K, p. T-4.) Two Well Pads, OB-4 and OB-5, and the project site are proposed along this route. However, the text contains no discussion of OB-4, OB-5 and the proposed project, no discussion of the Yuma clapper rail habitat along Vail Drain 5, or the potential impacts to the fully protected species and its habitat.

The text and tables fail to state that the Yuma clapper rail is a fully protected species. Appendix K and its appendices only state that the bird is threatened, when it is both endangered under federal law and fully protected under state law.

Data Requests

184. Please reconcile whether the survey conducted by Ogden in 1994 detected five clapper rail locations (AFC, p. 5.5-9) or eight (8) clapper rails (Appendix K, p. 8-1).

185. Appendix K is missing some of the survey results and data for Yuma clapper rail in 1994, 2001 and 2002. Please provide all survey results and data for Yuma clapper rail that you have.

186. Please explain whether California fully protected Yuma clapper rails 1) detected in 1994 at a potential well pad site at the Southwest Corner of Sinclair Road and Lateral Drain 4-A and 2) detected in 2001 along the east side of Well Pad OB1 were detected at the same location in both years or at two separate locations.

187. The AFC contains no analysis of the potential impacts to Yuma clapper rails and their habitat at the Southwest Corner of Sinclair Road and Lateral Drain 4-A and along the east side of Well Pad OB1, which is located in the Sonny Bono National Wildlife Refuge. Please provide an analysis of the project's impacts on the Yuma Clapper rail at these locations.

188. Please provide an analysis of the project's impacts on fully protected Yuma clapper rails in the freshwater marsh pond adjacent to the northern boundary of the project study area, that is located in the Sonny Bono National Wildlife Refuge.

189. Please provide an analysis of the potential habitat for the Yuma clapper rail in Vail Drain 5 along Severe Road (AFC, Appendix K, p. T-4), the proposed Well Pads, OB-4 and OB-5, and the project site, which are proposed along Vail Drain 5, and the impacts to Yuma clapper rail and their habitat.

190. Please revise your analysis of cumulative impacts to Yuma clapper rails and their habitat in light of your responses to the prior Data Requests .

191. Please provide all evidence that supports a conclusion that impacts to Yuma clapper rails and their habitat (AFC, Appendix K, p. 8-1) is consistent with the Fully Protected Species provisions of the Department of Fish and Game Code.

Background

The AFC relies on a number of historic surveys to demonstrate that the Project will not adversely affect desert pupfish (*Cyprinodon macularius*), a California and federally listed endangered species. Desert pupfish populations have historically been observed in agricultural drainage ditches and shoreline pools in the vicinity of the project site.

The Biological Assessment ("BA") in Appendix K of the AFC states that "only one drainage will be impacted by project activities," *i.e.* the drainage Vail 5 Lateral, which is crossed by the proposed pipeline from Production Well Pad OB-3 to the plant site (Appx. K, p. 5-1). Desert pupfish have historically been observed near the mouth of this drainage ditch in a 1994 survey (Appx. K, BA, p. 5-1, Table 4). Nevertheless, the AFC concludes that no impacts related to Project activities will occur because "no sign of desert pupfish occurrence in the 1998, 2000, and 2002 surveys" were observed along this pipeline route (Appx. K, p. 5-1) and because habitat modification "is expected to be minimal" (p. 5.5-8). However, these subsequent surveys are not conclusive because they were conducted using different and less reliable methods than the surveys that detected desert pupfish. Further, the AFC does not contain supporting information on the surveys.

First, desert pupfish populations show "[e]xtreme annual variability in catch numbers" at individual sample sites and within a season. Individuals move among habitats and trap results are influenced by a variety of factors including "location of trap placement, bait types, water level fluctuations, and

vegetation removal."[4] The AFC fails to include copies of the cited surveys. Absent information about methods and results of these surveys—which are only summarized in the Biological Assessment in Appendix K, Table 4—the conclusion of "no impact" cannot be validated.

Second, the traps in the 1994 pupfish survey that observed 53 desert pupfish in a shoreline pool below McKendry Road at Vail 5 Lateral were set overnight, whereas all subsequent surveys used only a 3 to 4 hour trapping time during the day (Appx. K, BA, Footnote to Table 4).

Third, as the AFC correctly states, "[d]uring winter months, when the water is cold, … [desert pupfish] become dormant, burrowing in the muddy bottom of their habitat." Thus, absent information on water temperature, the 2002 survey, conducted by Dr. A. Schoenherr in February 9, 2002, cannot be used as a reliable indicator for the absence of desert pupfish. Thus, it is conceivable that the only other surveys conducted at that location on August 25, 1998[5] failed to trap desert pupfish cause of the variability in catch or the fact that the traps were set only during 3 to 4 hours during the day.

Further, the Project might impact other agricultural drainage ditches that are potential desert pupfish habitat that were not considered in the AFC. Well pads OB-4 and OB-5 will be constructed immediately adjacent to Vail 5 Lateral. The pipeline from the plant site to injection well pads OBI-1, OBI-2, and OBI-3 will run parallel to Vail 4A for about 2000 feet before crossing Vail 4A and Vail 4. Further, well pads OBI-1 will be located adjacent to Vail 4 and OBI-2 and OBI-3 will be located adjacent to Vail 3A (see Figure 3.3-2A). The AFC presents only negative results from three historic surveys conducted at Vail 4A, the latest dated 1996, and one at Vail 3A from 1993 (Appx. K, Table 4).

The rapid decline of desert pupfish populations, the limited extent of their actual and potential habitat, and the fact that they have historically been observed in the vicinity of the project site,[6] warrant additional surveys

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[4] Ron Sutton, Bureau of Reclamation, Denver, CO, The Desert Pupfish of the Salton Sea: A Synthesis, August 5, 1999, http://cem.uor.edu/salton/recon/npupfish1.pdf, accessed November 29, 2002.

[5] One other survey had been conducted below McKendry Road on August 31, 2001, but Table 4 does not indicate that this survey was conducted in the shoreline pool.

[6] A CNNDB query result, dated October 1, 2001, and provided by the applicant in response to CEC staff's data adequacy recommendations, lists the historic occurrence of 26 desert pupfish at the mouth of Vail 5A lateral drain, 1000 feet north west of well pad OB-2 in 1991,

in these and any other locations potentially impacted by Project construction and operation activities.

Data Request

192. The AFC does not document the methods used for the desert pupfish surveys. Please provide a copy of all surveys cited in the Biological Assessment in Appendix K, Table 4, including a description of the methods used, water and air temperatures, the exact location, date, time, duration, and results of the studies, and the names and qualifications of the individuals conducting the surveys.

193. The AFC, page 5.5-14 states that subsequent surveys were conducted for pupfish for this Project at shoreline pools below McKendry Road after 1994 and Table 5.5-1C states that none were observed. However, Table 4 in Appendix K shows only one survey conducted at this location. Please provide a copy of the cited additional surveys.

194. The AFC states that a February 11, 2002 survey was conducted along the proposed pipeline route from Well Pad OB-3. This survey is not included in AFC. Please provide a copy of this survey.

195. The AFC, page 5.5-8, states that CDFG surveys "since 1998 have also been negative for the presence of desert pupfish." However, the AFC only mentions two such surveys, conducted August 31, 2001 and February 9, 2002, which did not cover most of the potentially impacted linears and facilities. (Appx. K, BA, Table 4.) Is the applicant aware of any other surveys, conducted since 1998, that were not summarized in the AFC? If yes, please provide a copy of these surveys.

196. Please conduct desert pupfish surveys at multiple locations along shoreline pools and drainage ditches Vail 5, 4A, 4, and 3a adjacent to production and injection well pads and pipelines as well as along all other waterways potentially impacted by construction activities, *i.e.* along roads and transmission lines. Please include a detailed description as above.

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and of 1 pupfish at an inshore pool above the mouth of Vail 4A, approximately 1500 feet north northeast of well pad OB 1, also in 1991 (see also Appx. K, Figure 4).

Background

Burrowing owls (*Athene cunicularia*) are frequently observed in the vicinity and on the Project site. (Appx. K, BA, p. 13-1). Burrowing owls are federal species of concern and a California species of special concern. This species is also protected from direct "take[7]" under the federal Migratory Bird Treaty Act (50 CFR 10.13) and its nest, eggs and young are protected under California Fish and Game Code (§3503, §3505.5, and §3800).

In surveys conducted by URS from 1999 through 2002, numerous burrowing owls were observed on the Project site (Appx. K, p. 13-1). The AFC fails to include a detailed description of the methods of the above surveys and merely provides the results (Appx. K, BA, Appx. A). Absent more detailed information about the methods employed during these surveys, their suitability cannot be validated. The California Department of Fish and Game ("CDFG") has adopted guidelines for burrowing owl surveys .[8]

The AFC provides no support for the statement that "no significant adverse effects on burrowing owls are expected to result from the construction or operation of the proposed project." (Appx. K, BA, p. 13-1/2). However, Project construction and operation activities could adversely impact burrowing owls. Subsidence potentially caused by re-injecting only 83% of produced water (p. 5.2-15) could lead to a wide-spread collapse of burrows on site and in the surroundings of the Project. Noise and vibration from well drilling, steam blows, and other construction activities as well as operation and maintenance-related activities could result in additional displacement of burrowing owls. Land disturbance during grading could result in temporary creation of artificial holes that could attract burrowing owls and result in fatalities. None of these impacts were discussed or evaluated.

The AFC suggests "[w]here possible, active owl burrows will be avoided" within 150 feet of construction activities (Appx. K, p. 13-1). Further, at least three pairs of burrowing owls, currently on or adjacent to areas that will be graded, will be displaced by the Project (Appx. K, p. 15-1). The AFC

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[7] Disturbance that causes nest abandonment and/or loss of reproductive effort (*e.g.*, killing or abandonment of eggs or young) or the loss of habitat upon which the birds depend is considered "taking."

[8] California Burrowing Owl Consortium, Burrowing Owl Survey Protocol And Mitigation Guidelines, 1993, http://www.dfg.ca.gov/hcpb/species/stds_gdl/bird_sg/boconsortium.pdf, accessed November 30, 2002.

proposes passive relocation of these and any other active owl burrows within 150 feet of Project construction activities through collapsing burrows and installing passive relocation vents, *i.e.* one-way exclusion devices. No mitigation measures are proposed other than worker education programs, pre-construction surveys, and approval of construction activities by a biological monitor (p. 5.5-30).

Burrowing owls typically rely on abandoned ground squirrel or other rodent holes; they only rarely excavate their own burrows. This species exhibits strong site fidelity, and often returns to the same nesting areas over consecutive years.[9] Thus, merely collapsing active burrows is not a sufficient relocation measure as the displaced owls will likely search for nearby holes for shelter and nesting. In addition to collapsing active burrows, any other empty natural or artificial holes, *e.g.*, manmade structures such as cement culverts, concrete slabs, or debris piles, onsite or within a 150-foot buffer zone from the construction activities must be identified and provided with passive relocation vents and/or be destroyed during a pre-construction survey.[10] A time period of at least one week is recommended to allow the owls to move and acclimate to alternate burrows.

The CDFG burrowing owl mitigation guidelines recommend that artificial or natural burrows be provided at a ratio of 2:1 in the vicinity of the original burrows but outside the area potentially affected by the Project (including a 160-foot buffer zone).

While the AFC acknowledges that the Project will result in loss of suitable burrowing owl foraging habitat (Appx. K, BA, p. 15-1), it fails to provide an estimate of the acreage and appropriate mitigation measures. CDFG guidelines further recommend that if suitable habitat on-site is reduced to below the threshold level of 6.5 acres per relocated pair or unpaired resident bird, the habitat should be replaced off-site.[11]

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[9] Id.

[10] Id.

[11] Off-site habitat must be suitable burrowing owl habitat as defined in the CDFG guidelines. Land should be purchased and/or placed in a conservation easement in perpetuity and managed to maintain suitable habitat.

Data Request

197. Please provide a description of the methods employed for burrowing owl surveys, which were conducted by URS from 1999 through 2002 including time of day, frequency, and coverage of habitat.

198. Burrowing owls were detected along roadways in the vicinity of the Project site. The Project would increase traffic, thus potentially placing the owls at risk of collision with vehicles. Please evaluate the impact of the increase in traffic on burrowing owl populations. Support your answer with calculations, reports, surveys, and all other relevant supporting information.

199. Please provide an analysis of the impact of subsidence, vibration, and noise from project construction and operation on burrowing owls. Please support your answer with calculations, references to the literature, surveys and all other information that supports your conclusions.

200. Is the applicant willing to accept a condition of certification that would require adoption of a mitigation plan according to the CDFG guidelines that includes, among other things, the identification of a mitigation site and any activities necessary to enhance the site, including the construction of artificial burrows?

201. If your response to the Data Request #200 is no, please justify your answer and propose an acceptable alternative.

202. If your response to Data Request #200 is yes, please provide a detailed mitigation plan for passive relocation of owls and appropriate mitigation measures according to the guidelines adopted by CDFG. Please provide an estimate of the acreage of suitable burrowing owl habitat that will be destroyed by Project activities and an appropriate mitigation plan according to the guidelines adopted by CDFG. If habitat is reduced to below the threshold level of 6.5 acres per relocated pair or unpaired resident bird, please identify potentially suitable, available land that can be set aside for off-site mitigation consistent with the replacement ratios of the CDFG burrowing owl mitigation guidelines.

Background

The biological documentation provided in Appendix K, Biological Assessment, Table 3, indicates moderate impacts to burrowing owls for all project components, *i.e.* plant site, transmission lines, well pads, and pipelines. In contrast, the AFC in its biological resources section states that with mitigation "no significant adverse effects on burrowing owls are expected to result from the construction or operation of the proposed project" (Appx. K., p. 13-2) and that cumulative impacts will be "less than significant" (p. 5.5-23). As discussed above, mitigation measures proposed for the burrowing owl do not comply with the CDFG requirements. Further, the AFC does not provide any information on how these conclusions were derived.

Data Request

203. Please all evidence that supports the analysis in Table 3. Your answer should include the criteria used to classify impacts as low or moderate and to exclude high impacts.

204. Is a moderate impact significant and thus requires mitigation?

205. Do the rankings in Table 3 assume the implementation of any of the mitigation measures in Section 5.5.4? If yes, which mitigation measures are assumed?

Background

The AFC specifies that "compensation for permanent impacts to sensitive species habitat will follow guidance provided by the wildlife agencies" (Bio-24, p. 5.5-31). This language is found in a paragraph on compensation land acquisition that begins with "[t]he Applicant is evaluating areas near the project site to mitigate project impacts to Yuma clapper rail and wetland areas." It is unclear whether the planned land acquisition refers only to Yuma clapper rail and wetland areas or to other sensitive species.

Data Request

206. Please clarify whether any land acquisitions are proposed as habitat replacement for sensitive species other than the Yuma clapper rail and wetlands.

207. If any land acquisitions are proposed as habitat replacement for sensitive species other than the Yuma clapper rail and wetlands, please identify for which species land acquisitions are planned and specify the mitigation ratios.

208. What mitigation ratios are proposed for the Yuma clapper rail and wetland areas? Please support your answer.

Background

Collisions with transmission lines have been documented as a source of bird mortality. Commonly associated with migratory birds, collisions are likely to occur during periods of darkness or inclement weather, and usually occur when birds impact overhead ground wires. Because of the large numbers of migratory birds in the proposed project area, the transmission lines associated with the project could pose a significant collision hazard.

The AFC specifies seven locations where bird flight diverters will be installed along the transmission lines to make the lines more visible to birds. (p. 5.5-31, Bio-23.) Installation of bird flight diverters is expected to reduce the number of bird flight casualties associated with new transmission lines. The AFC uses implementation of this measure to justify "no significant adverse effect" on the endangered California brown pelican, Yuma clapper rail, American white pelican, and gull-billed tern (Appx. K, BA, pp. 7-2, 8-2, 12-2, 14-1).

The locations of the proposed bird flight diverters were determined based on the results of flyover surveys, *i.e.* where the number of birds flying perpendicular to the proposed line exceeded 30 individuals. The AFC does not provide any support for this 30 individuals threshold. Further, the flyover surveys were inadequate to reasonably locate the diverters. First, "data collection was restricted to waterfowl and shorebirds that were observed moving from resting areas to inland foraging areas or from foraging areas to resting areas" (Appx. K, p. 3-9). Second, the description of the surveys provides no information about either date, time spent at each site, or rate of recurrence of the conducted surveys. Absent this information, the conducted flyover surveys cannot be reasonably used to determine the number of bird flight diverters that should be installed.

The proximity of the Project to the Sonny Bono Wildlife Refuge and the large number of migratory birds in the general area may require additional mitigation measures, *e.g.*, to avoid negative impacts to raptors from the new

transmission lines. Mitigation measures could include the installation of inverted "Vs" on power pole cross-members to prevent raptors from perching in specific locations where they may become electrocuted; placement of bird flight diverters over insulators and conductors to prevent raptors from making contact with energized conductors; placement of insulator covers over insulators and conductors to prevent raptors from making contact with energized conductors.

Data Request

209. Please provide all evidence justifying the threshold of 30 individual birds observed in flyover surveys for determining where bird flight diverters will be installed.

210. Please develop an appropriate mitigation plan, including a list of measures that will be implemented for raptors, the location where each measure will be deployed, and all evidence justifying each choice.

211. Other projects (e.g., Sutter,[12] Russell City[13]) with transmission line biological impact issues have been required to implement much more stringent mitigation than proposed for Salton Sea Unit 6. Does the applicant agree that the following mitigation measures, required for these other projects to avoid or mitigate project impacts to migratory birds, should be applied to these transmission lines?

    (a) Power lines shall be constructed following recommendations in *Suggested Practices for Raptor Protection on Power Lines: The State of the Art in 1996*, by the Avian Powerline Interaction Committee, 1996.

    (b) Power lines located in sensitive areas shall be fitted with bird flight diverters placed on the ground wire at 16.4-foot intervals.

[12] California Energy Commission, Sutter Power Plan Project, April 1999, pp. 161-163.

[13] California Energy Commission, Russell City Energy Center Power Plant Project, Commission Decision, September 11, 2002.

(c) Measures shall be taken in areas of high migratory bird use, particularly during the winter season, to flush birds from the construction area prior to stringing wires.

(d) Develop a monitoring plan to analyze whether the transmission line and other project facilities are causing significant impacts from avian collision and/or electrocutions. If it is determined that significant impacts are occurring, propose remedial mitigation measures to be implemented. A report presenting the monitoring data and a discussion of the mitigation effectiveness shall be provided annually for 10 years following the completion of construction. If it can be shown that impacts to birds from the project are not occurring, licensee has the option to request staff to decrease the frequency or cease monitoring.

(e) Underbuild distribution lines wherever possible. Underbuilt lines should be spaced below conductors to provide a vertical clearance of at least 43 inches.

Background

The AFC does not consider the impact of potential operational spills of hot brine from production or injection pipelines into drainage ditches and onto wetlands. Appendix O provides evidence that large brine spills and hydrochloric acid spills are possible and have occurred in the Salton Sea area. For example, a 55,000 gallon geothermal brine spill occurred in June 2000 and a 72,000 gallon geothermal brine spill occurred in August 2000 at Salton Sea units 3 and 5. In addition, a 49,000 gallon hydrochloric acid spill occurred in March 2000. Brine spills could have direct and indirect negative effects. For example, a spill of hot brine into a drainage ditch could potentially destroy an entire population of desert pupfish due to the extreme temperature of the brine. Indirect effects may include toxicity associated with the mineral-laden brine, *e.g.*, due to high concentrations of boron or arsenic.

Data Request

212. Please analyze the direct and indirect impacts of potential accidental operational spills of hot brine on plant and wildlife communities.

Background

The proposed brine ponds, two large cement-lined open basins, will receive a number of waste streams. These include up to four hours of spent brine released from the clarifiers under upset conditions, liquids from the thickener, from bermed areas around plant equipment, from emergency relief tanks, reject water from the reverse osmosis system (AFC, pp. 3-11, 3-16; Response to CEC Data Adequacy Comments, p. BIO-4), brine from production wells when they are flow-tested after drilling, and brine from production wells when brine is initially introduced into the facility during startup. (Application for Waste Discharge.) The brine pond composition data in Table 3.3-2 indicates that accumulated waters contain high concentrations of substances that could be toxic to wildlife, including boron, arsenic, lead, cadmium, zinc, and hydrogen sulfide.

The Response to CEC Data Adequacy Comments,[14] page BIO-4, claims that brine pond waters will not pose a hazard to wildlife "because the availability of other water sources and desert adaptations to conserve water, desert species will not preferentially utilize the briny water sources." However, no information is provided to support this claim, which is contrary to observations.

First, the AFC contains no evidence on how long the waters will remain in the ponds. Some water will remain in pools in this large, shallow reservoir and will become increasingly concentrated due to evaporation. Further, the brine from clarifiers and thickeners contains large amounts of dissolved and suspended solids, which will partially precipitate. Observations at the CalEnergy Leathers Plant geothermal facility show that, in fact, over time, the ponds accumulate sludge and have numerous small pools of standing water.

Second, while some wildlife may be adapted to conserve water, the birds that are likely to be attracted to the ponds are not desert species with

[14] C.E. Obsidian Energy LLC, Salton Sea Unit 6 Power Plant Project – Response to CEC Data Adequacy Comments Dated August 21, 2002 – (02-AFC-02), September 18, 2002.

such adaptations. Many birds are attracted to shallow pools of standing water for baths during which they also typically drink the water they bathe in. Taste aversion to the salinity of the brine and involuntary rejection of the brine has been cited as a sufficient deterrent to limit the intake of water of those species that attempt to drink from the ponds, *i.e.* birds and small mammals, however, no evidence of this effect was provided. Further, saline water can encrust feathers and lead to mortality, particularly when temperatures drop in the winter. Finally, accumulation of algae on the pools of standing water can attract some birds, such as ducks, and provide a potential route of contamination via food. The standing water pools will also attract a myriad of insects, which – not having any taste aversion to the saline fluid – will bioaccumulate toxic constituents in their tissue. These insects will provide food for many of birds in the vicinity and thus present a source of toxic contaminants.

Third, impacts on bats were excluded because "they do not require a free source of water to remain in daily balance. Their water requirements are met with water associated with their food (insects) and that derived from metabolism (metabolic water)." Response to CEC Data Adequacy Comments, p. BIO-5. This statement is not supported by the literature. An overview of North American bats states that "[a]bout 75-80 percent of the daily water requirement of insectivorous bats can be met by metabolic water or preformed water in the diet, but the remainder is drinking water, presumably gathered from a pond or stream. Reduction or pollution of available water can affect the diversity of bats directly through dehydration or toxic effects." [15] Further, bats consume enormous amounts of insects; during late lactation they typically consume more than their own weight in insects each night.[16] As described above, insects will be a route of exposure to toxic levels of contaminants. It has been demonstrated that bats accumulate metals from the food chain.[17]

Finally, the U.S. Fish and Wildlife Service has considered impacts to birds breeding at similar basins containing elevated levels of selenium as a significant environmental impact under NEPA and a violation of the

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[15] A. Kurta, Bats at the Surface: The Need for Shelter, Food, and Water, Proceedings of Bat Conservation and Mining: A Technical Interactive Forum, St. Louis, Missouri, November 14-16, 2000.

[16] Id.

[17] T.J. O'Shea, D.R. Clark, Jr., and T.P. Boyle, Impacts of Mine Related Contaminants on Bats, Proceedings of Bat Conservation and Mining: A Technical Interactive Forum, St. Louis, Missouri, November 14-16, 2000.

Migratory Bird Treaty Act. Thus, the Service's position has been to eliminate impacts or require mitigation for the operation of ponds with elevated levels of toxic metals.

Data Request

213. Please explain how the decision is made to remove water from the ponds, *e.g.*, automatic level sensors that trigger a pump, employee observation, and manual activation of pump/injection well. Please support your answer with a piping and instrumentation diagram ("P&ID") and an operations plan for pond evacuation.

214. Based on the existing brine ponds, please provide the following information and all evidence to support your answers:

    (a) How frequently, *e.g.*, percent of year, is standing water present in the ponds?

    (b) For each waste stream, what is the average amount of time water is present in the ponds after a release?

    (c) What is the annual average depth of water in the ponds?

    (d) What is the sludge accumulation rate in the ponds in inches per year?

    (e) How frequently is sludge removed from the ponds?

215. Have any surveys been conducted of wildlife use of the existing brine ponds? If yes, please provide copies of all such surveys.

216. Please provide all references, surveys, and other information that support your claims that the ponds do not pose a significant ecological risk to wildlife and specifically, support your following claims:

    (a) There is no risk due to the availability of other water sources.

(b) There is no risk due to desert adaptations to conserve water.

(c) There is no risk because desert species will not preferentially utilize the briny water sources.

(d) There is no risk because the brine will cause taste aversion and involuntary rejection.

217. The ponds will receive runoff from bermed areas around plant equipment. Thus, they may contain oils and greases which could coat bird feathers. Please estimate the amount of oil and grease that may be present in brine pond discharges.

218. Please provide a detailed assessment of the impacts of brine pond contents (including all waste streams) on wildlife, with a particular focus on birds and accumulation in the food chain.

219. Please provide an assessment of the impact of dietary uptake of water from brine ponds and accumulation of contaminants in insects to local bat species.

220. Is the applicant willing to accept mitigation measures to lessen the impacts from ponds on wildlife, including redesign of the ponds to make them less attractive to wildlife, use of screen covers, and hazing? If no, please justify your answer.

Background

The AFC evaluated the impact of PM10, NO_2, SO_2, H_2S, and NH_3 emissions on biological resources. (AFC, Sec. 5.5.2.1.) However, its analysis does not consider deposition of cooling tower drift and other constituents of concern, such as arsenic and boron. Cooling tower drift emissions will be deposited on agricultural crops, the Salton Sea, and the plant and wildlife communities in the Sonny Bono National Wildlife Refuge ("Refuge"), which borders on the Project to the north.

Cooling tower drift, water droplets with the same composition as the circulating water, is typically deposited within 2,000 feet of the tower. Emissions from the Project's cooling towers contain a number of substances that can adversely affect biological resources. Potential effects due to the accumulation of these substances on the ground over the life of the Project

include wildlife toxicity and phytotoxicity, *i.e.* toxicity to plants, due to deposition of boron, fluorine, and arsenic. Further, deposition of ammonia can result in both phytotoxicity and fertilization. The AFC only evaluates acute phytotoxicity due to gaseous ammonia. The AFC correctly states that ammonia may affect biological resources through increased nutrient loading, yet it fails to analyze fertilization impacts on local plant communities. (AFC p. 5.5-20). Modeling of cooling tower drift emissions shows the highest arsenic and boron depositions, 0.36 and 10.76 micrograms per square meter per year, respectively, north of McKendry Road at the southern edge of the Refuge.[18]

The AFC indicates that 2,681 ton/yr of NH_3, 10.7 ton/yr of H_2S, and 126.1 Ci/yr of radon would be emitted from the cooling towers. (AFC, Table G-8.) High levels of boron would also be emitted. Much of this would be deposited in the vicinity of the facility. The NH_3 would cause fertilization, H_2S could cause phytotoxicity, and radon could be accumulated in crops, resulting in public health impacts to consumers. Individual plant and algal species show different capacities to respond to ammonia fertilization. Thus, sustained ammonia deposition over the life of the Project can cause a shift in species abundance and, thus, result in habitat alteration. For example, the algal community structure in wetlands may change as, *e.g.*, chlorophytean species (green algae) and Euglenophytes (one-celled, mobile algae) respond particularly well to increases in ammonium.[19] This enhanced response to ammonia fertilization could modify the occurrence and type of algal blooms in the Refuge wetlands, affect associated zooplankton communities, and in turn the entire food chain upon which many of the millions of migratory birds who use the Pacific Flyway rely. The same applies to macroscopic plant communities, whose composition could change over time, resulting in changes of wetland plant communities including the density increases of grasses or the decline of other species.

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[18] Deposition modeling was conducted using the ISCST3 model and the applicant's emissions and meteorological data. Deposition velocities and rates were estimated by the ISCST3 model based on the initial particle size distribution of the cooling tower droplets (following mitigation by the drift eliminator) and the dilution water heaters.

[19] U.S. Environmental Protection Agency, Impacts on Quality of Inland Wetlands of the United States: A Survey of Indicators, Techniques, and Applications of Community Level Biomonitoring Data, Report #EPA/600/3-90/073, http://www.epa.gov/OWOW/wetlands/wqual/algae.html, accessed November 30, 2002.

In crops, effects due to boron toxicity have been observed at levels as low as 80 parts per million ("ppm"). Symptoms include seedling mortality (barley) and yellowing of leaf tips followed by formation of necrotic tissue. [20,21] In waterfowl, boron accumulation has been shown to cause reproductive damages. A study on young ducklings suggested that there may already be cause for concern regarding the uptake of boron via vegetation at the Salton Sea. Dietary concentrations of as low as 30 g/g wet weight resulted in weight reductions of young waterfowl, which is similar to the current concentration in vegetation; another study only demonstrated effects at much higher levels (900 g/g dry weight).[22] The additional deposition of boron onto vegetation via cooling tower drift emissions could potentially increase boron contamination of waterfowl forage to toxic levels, especially for bird species that breed in the area.

Effects of fluorine on crops include retarded growth and susceptible species can be injured by foliar fluorine concentrations of as low as 20–50 ppm. Of greater concern are the toxic effects of fluorine on humans and animals through consumption of crops and forage. The toxic threshold for forage crops has been set at 30–40 ppm.

Upper levels of 1 to 20 ppm arsenic are commonly reported for a 10% depression of crop yield. Arsenic is also toxic to wildlife and strongly toxic to aquatic life.[23] Canada has set water quality guidelines for arsenic for the protection of aquatic life at 5.0 micrograms per liter ("µg/L").[24]

An evaluation of the effects of cooling tower emission deposition needs to demonstrate that the addition of the cooling tower (and other Project) emissions to the current levels of these contaminants in water and soils will not cause significant impacts.

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[20] B. Hock and E.F. Elstner, Schadwirkungen auf Pflanzen, BI Wissenschaftsverlag, 1988.

[21] A. Kabata-Pendias and H. Pendias, Trace Elements in Soils and Plants, CRC Press, 1992.

[22] C. Roberts, U.S. Fish and Wildlife Service, Boron Contamination of Waterfowl at the Salton Sea and Implications for Avian Impacts, 1999.

[23] Commission on Life Sciences, Arsenic: Medical and Biological Effects of Environmental Pollutants, National Academy of Sciences, 1977.

[24] Canadian Council of Resource and Environment Ministers, Canadian Water Quality Guidelines, Appendix XXIII, 1997.

Data Request

221. The brine contains elevated concentrations of fluorine (AFC, Table 3.3-1), but the emission inventory does not include fluorine. (AFC, Appx. G.) Please estimate fluorine emissions from all Project emission sources and support your answer with engineering calculations and a fluorine material balance that shows all fluorine sinks.

222. The brine contains elevated concentrations of boric acid (AFC, Table 3.3-1), some of which is emitted from the cooling towers. The boron emissions from the cooling towers in Table G-7 are not proportional to the TDS emissions as they should be, e.g., 4500 ppm/235,000 ppm does not equal 0.266 ppm/315 ppm. Thus, please support the boron concentration of 0.266 ppm in the cooling tower circulating water and the cooling tower emission rate of 9.02×10-4 ton/yr in Table G-7 with an engineering calculation and a boron material balance that shows all boron sinks.

223. Please provide all evidence that crops will not be present immediately south and east of the facility, over the operational life of the facility.

224. Please provide all evidence that drift from the towers will not contaminate the water pond between the two towers (AFC, Fig. 3.3-1B).

225. Very large amounts of NH_3 will be emitted from the towers, most of which is attributed to off-gassing, followed by noncondensible gases. (AFC, Table G-8.) Since NH_3 is very soluble in water, presumably some of the noncondensible gaseous ammonia and off-gassing NH_3 will dissolve in the drift and be deposited downwind of the tower.

    (a) Please estimate the equilibrium distribution of NH_3 between the dissolved and gaseous state in cooling tower emissions. Support your answer with calculations, references and all other relevant information.

(b) Please prepare a deposition analysis for NH_3 which considers its distribution between gaseous and dissolved states. Support your answer with model input and output files.

226. Please provide an analysis of the impacts of fertilization on local plant communities as well as plant and wildlife toxicity effects due to deposition of pollutants associated with cooling tower drift emissions.

Background

The AFC states that a number of other California species of special concern "are too common and/or widespread to warrant detailed discussion" (p. 5.5-12). Abundant presence of sensitive species in the general area cannot be used as a reason to preclude all analysis of Project impacts. For example, many bird species that are abundantly observed in the area are migratory and impacts on these birds may affect the status of local populations hundreds of miles away. Thus, impacts to any species that arise from Project activities need at least be considered.

Data Request

227. Please provide an analysis of potential Project impacts on other sensitive species listed in Table 5.5-1C (p. 5.5-42) not previously presented in the AFC.

Background

Construction-related noise could directly impact sensitive species, breeding areas, and wildlife using the surrounding areas. Ducks, geese, long-distance migratory birds and colonial nesting birds were found to be particularly susceptible to noise disturbances.[25] Staff requested that the applicant provide construction and maintenance-related noise levels and evaluate the potential impact to ground-nesting birds due to low-level

[25] J. Burger, The Effect of Human Activity on Birds at a Coastal Bay, Biological Conservation, 32:231-241, 1981, and B.J. Markham and S.H. Brechtel, Status and Management of Three Colonial Waterbird Species in Alberta, Proceedings of the Colonial Waterbird Group, 1978.

vibration.[26] In addition, impacts to other sensitive species should be evaluated.

Data Request

228. Please provide an assessment of noise-related impacts on wildlife. Please identify and justify significance thresholds and support all analyses with literature references, studies, and all other information that supports your conclusions.

Background

Surveys summarized in the AFC identify the presence of Yuma clapper rail in the Project vicinity. [Appx. K, BA, p. 8-1]. The AFC acknowledges that Yuma clapper rail may be significantly impacted by construction noise during the breeding season. However, the proposed mitigation for this significant impact, Bio-10, defers the detailed analysis and mitigation of this impact to future studies. A project-specific construction noise assessment would be conducted during final design. Pre-construction surveys would be conducted to identify rails. Mitigation measures would be identified in the future. (AFC, p. 5.5-29.) Deferring the noise assessment until after Project approval does not allow the CEC to evaluate the impacts, determine mitigation, or make findings required by its regulations.

Data Request

229. Please prepare a project-specific construction noise assessment of the impacts on the Yuma clapper rail.

230. Please identify mitigation measures to minimize construction noise impacts identified in the prior Data Request.

231. The AFC states that the steam blow process will be scheduled to coincide with the non-breeding season of the Yuma clapper rail only "if feasible." If not feasible, please identify measures to reduce the noise impacts of steam blows to a less than significant level.

[26] California Energy Commission, Salton Sea Unit #6 Project (02-AFC-2) Data Requests, October 30, 2002.

(a) How many steam blows will occur over the life of the Project?

(b) What is the duration of a typical steam blow?

232. Measure Bio-10 limits construction to the non-breeding season only if pre-construction surveys identify clapper rails in any area where noise levels will exceed 60 dBA. Would the applicant be willing to modify this condition to limit construction to the non-breeding season in any area where clapper rails have been identified in any survey conducted over the past 5 years? If no, please justify your answer.

Background

The 200-ft survey buffer zone used to identify sensitive species occurring in the vicinity of the plant may not represent a sufficiently large buffer zone for all species. The surveyed buffer zone should be individually determined depending on the daily range of a species. For example, raptors such as osprey, hawks or falcons, have a range of daily movements of half a mile or more; thus, their daily movement extends far beyond the 200-ft survey buffer zone used in the AFC.

Data Request

233. Please identify the daily range of all sensitive species identified in Table 5.5-1C (p. 5.5-42) and support those ranges with literature references. Please provide additional surveys for all species whose daily range extends beyond the previously surveyed 200-foot buffer zone.

Background

Accurate documentation of potentially disturbed habitat is essential for determining potential impacts on fully protected, endangered and threatened species and species of special concern. However, the estimated area of disturbed habitat in Table 5.5.-1D, Table 3.2-2, and Table 5 in Appendix K are inconsistent.

Data Request

234. Please reconcile the estimated area of disturbance/habitat impact by the project component in acres in Table 5.5.-1D, Table 3.2-2, and Table 5 in Appendix K.

Background

The AFC indicates that Salton Sea Unit 6 will potentially impact many federally endangered and threatened species on state, county and private property. Once species have been listed as threatened or endangered under the federal Endangered Species Act (ESA), they are entitled to certain regulatory protections. Section 9 of the ESA specifically prohibits the taking of any endangered species of fish or wildlife. The term "take" is defined as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any such conduct."

Under Section 10 of the ESA, private individuals and states may receive exemptions from the prohibitions on incidentally taking species. An incidental take permit can be obtained to develop land or conduct any legal activities not directed at harming the species. As a requirement to obtain an incidental take permit to develop land, the landowner must formulate a Habitat Conservation Plan (HCP). HCPs allow development of portions of habitat used by listed species in exchange for the creation and implementation of a plan designed to conserve the same species in the remainder of the habitat.

Data Request

235. Please provide a table indicating the listing status of all species and critical habitat in the vicinity of the Salton Sea Unit 6 project under the federal ESA and the California ESA.

236. Please provide a schedule for your development of a Habitat Conservation Plan to enable the incidental take of species on state, county and private property.